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Labour market job matching for UK minority ethnic groups.

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ABSTRACT

Estimates of over education from different ethnic groups are presented using a new method of calculating over education and data from the UK Labour Force Survey. Calibrated against existing mean methods, the new approach leads to lower levels of over education for men and women. While the overall extent of over education has similarities with earlier studies, the differences between ethnic groups are far less than those found in some studies and fall even further when we control for other productivity related differences. Gender differences can be partially explained by differences in working part-time, whereas some ethnic differences are exacerbated slightly by being temporarily over educated, as well as by differences in the subject of degree.

Keywords: Qualifications; discrimination; employment; ethnicity.

JEL Classifications: J24 J15 J71.

1.Introduction

There has been much research examining the unequal and disadvantaged labour market position of UK minority ethnic groups. Studies have identified, through situation testing, that discrimination occurs when individuals from all non-White minorities apply for jobs (Brown and Gay, 1985). Although this type of discrimination has declined in the UK over successive studies, it has not disappeared. It is not surprising then to see considerably higher unemployment rates, particularly among Black and minority groups, and very much higher in the case of young Black men. Many minority ethnic groups also display lower earnings, after controlling for other characteristics, when they are in paid work. One important conclusion from the existing literature is that the labour market position varies considerably between groups and so this should be recognised in analyses by examining them separately. The factors which help to explain the labour market inequalities in economic activity for both men and women from different ethnic groups have been identified (Leslie et al 2001; Blackaby et al, 2002; Dale, et al 2006). Qualifications have been found to be very important in explaining such differences between ethnic groups' participation and unemployment rates (Leslie et al, 2001; Lindley et al, 2006). Relatively few studies have examined the role of education in explaining the occupational status of minority ethnic individuals. In the UK, this is largely due to the lack of suitable data with sufficient sample sizes to carry out a separate analysis for each of the minority ethnic groups. This paper seeks to analyse the issue of job matching in the labour market across UK ethnic groups, both men and women, using the large sample sizes that can be generated from the Quarterly Labour Force Survey. The main question we seek to answer is whether the process of job matching is approximately equal for individuals with given levels of qualifications from any of the main ethnic groups.

In the rest of this paper we first review the findings from the prevailing literature which seeks to examine the matching process of educational qualifications to jobs and the measurement of

over education (Section 2). We then present our new approach to modelling this process and measuring the inequalities between minority ethnic groups (Section 3). Section 4 describes the data and some of the relevant descriptive statistics. We present our findings on the extent of over education in Sections 5, 6 and 7. Section 8 considers some alternative explanations for the ethnic differences found. Our conclusions are presented in Section 9.

2. Earlier studies

Earlier studies of over education have revolved around a number of themes; first there has been a lot work trying to devise good measures of over education and three have been proposed and used, all with their own limitations. The three methods consist of:

1) Using ***workers' self assessments***, through survey questions asking for subjective assessments of whether they are working in jobs that require their qualifications to be able to do or get the job.
2) The ***education requirements*** method, mainly used for examining graduate over education, attempts to be more objective by classifying occupation codes into those that do or do not require a degree level qualification to be able to do (or be recruited to) the job.
3) In this approach, ***the mean/mode method***, the distribution of educational qualifications is calculated for each occupation, and employees in this occupation who depart from the mean (or mode) by more than one (ad hoc) standard deviation above the mean/mode are deemed over-educated. This definition can be sensitive to cohort effects and the level of aggregation used for occupations.

Consequently, the amounts of over education have varied widely depending on the definition used. Sloane et al (1999) estimated for the whole British workforce that 31 per cent were over

educated. Similar figures were found in Green et al (2002, Table 2) for a 1986 survey (30%), a 1992 survey (31.2%) and a 1977 survey (32.9%). Dolton and Vignoles (2000) estimated over education for 1970 graduates, six years after graduating to be 13 per cent and for 1980 graduates after 6 years to be 30 per cent. Battu et al (2000) provided a review of the different estimates of over education showing they ranged from one fourteenth to two thirds of the workforce. Battu et al (2000) also found there was weak correlation between measures. The standard deviation measure (3 above) gave the lowest percentages of over education, and the other two measures were higher and roughly equivalent.

More recent approaches to measuring over education have started to combine data from different sources. Green and McIntosh (2006) pointed out that less than half of those defined as over educated reported having skills they were not using in their job. This has led to the recognition that the use of only one of the above definitions will lead to the spurious and over classification of over education. Chevalier (2003) combined several measures to define over education and the skill level of graduates to create 6 possible outcomes including defining a category of 'apparent over education'. A later paper also incorporated workers' job satisfaction scores (Chevalier and Lindley, 2006).

Secondly, while earlier work tended to be empirical and somewhat unrelated to theory, following Hartog's (1997) criticism of this state of affairs, attempts were then made to ground the definitions of over education in different theoretical perspectives of the workings of the labour market (Green et al, 2002). A fully efficient labour market or pure human capital theory would predict that over education could not occur, except in a short-term transition from dis-equilibrium back to equilibrium market clearing and perfect job matching. However, if the labour market does not function with perfect efficiency, over education will occur and may persist. This could occur if institutional rigidities or frictions exist or matching occurs

through a queuing mechanism. Some jobs could give higher preference to skills that are not related to education; there could be imperfect substitution between workers with different forms of human capital, transaction costs, legal or union hurdles from restructuring (or dismissing) workers to get a better match of their qualifications to their job. Also recruitment is based on asymmetric information and therefore subject to inefficient matching and even moral hazard. The consensus from these discussions, in the light of empirical work, is that over education is not a temporary phenomenon, and that the labour market does not, therefore, operate with perfect efficiency, and certainly not for graduates for whom the most empirical evidence has been collated (Dolton and Vignoles, 2000; Green et al, 2002).

Thirdly, having estimated empirically the extent of over education, studies have also examined the correlates of individuals being either over or under educated for the job they hold. Among the significant individual characteristics for graduates are certain supply-side skills, A level scores, the type of university attended, the subject studied, and being White compared to non-White. Sicherman's (1991) findings linked training (positively) and experience (positively) to the extent of over education, and to greater occupational mobility over a one year period. He argued that this was evidence showing that career paths in some jobs involve starting at the bottom rung, along side those who will never go much further, but progressing upward for those recruited to the career track. The consequences of this for over education were that it would appear higher at any point in time than was genuinely warranted and had, therefore, a spurious element.

Over educated workers have been found to have lower hourly pay, ranging between 15 to 26 per cent less than their peers with the same level of educational qualifications and to be more likely to be dissatisfied with their jobs (Sloane et al,1999; Battu et al, 1999; Dolton and Vignoles, 2000; Chevalier, 2003; Chevalier and Lindley, 2006;). However the inclusion of

controls for skills (Chevalier and Lindley, 2006) and taking unobserved heterogeneity into consideration (Chevalier, 2003) reduced this pay penalty.

Evidence on pooled groups of non-Whites in the 1990s suggested that non-White employees had a greater degree of over education than White employees (Alpin et al, 1998) and that minority ethnic graduates found it harder than White graduates to get graduate level jobs (Connor et al, 1996, 2004). Lindley and Lenton (2006) found that the rates of over education among non UK-born immigrants were considerably higher than for natives in all ethnic groups (Table A1 in the Appendix). They ranged from 37 per cent for White native men to 79 per cent for African native men and from 56 per cent for immigrant White men to 84 per cent for African immigrant men. The ranges were narrower for women but higher for immigrant than native, lowest for White women and highest for African women. Lindley and Lenton's rates of over education were considerably higher for all ethnic groups, including Whites than those found by Battu and Sloane (2004) despite using a similar measure of over education but on a different data set.

In the rest of this paper we suggest an alternative approach to calculating the extent of over education for separate minority ethnic groups by gender and estimate its extent using existing large-scale data from the Quarterly Labour Force Survey.

3. Identifying ethnic inequalities

Our suggested approach to measuring mismatch between education and jobs differs from those used in earlier studies. Since we are setting out to examine the whole workforce, and not just graduates, using an external classification of (graduate) jobs (method 2) as defined above, is not suitable. Similarly, our data, while containing sufficient samples of minorities, does not

offer the self classification (method 1) of whether the individual's qualifications were used or necessary in the job. The mean-mode method (method 3) is therefore the only existing method open data that does not contain specific questions of job satisfaction. We have therefore devised an alternative approach which predicts individuals into occupational categories using multivariate analysis. This method has some clear advantages over the mean-mode method since it allows for differences between non-qualification elements of human capital such as labour market experience and job-specific skills. However, we do compare the two methods directly.

We take the stock of occupations at the time of our analysis as fixed, and we examine, through simple multivariate analysis, the allocation process linking individuals' qualifications and productivity-related characteristics to their jobs. We accept that this allocation is unlikely to be perfect and is likely to suffer from some degree of error.[1] However, since our main concern is with ethnic differences, we can justifiably ignore such errors, on the grounds that, under equality, they will occur randomly and sum to zero in all ethnic groups.

Consider a set of k mutually exclusive occupation groups 1 to k. Let Y_i be an index variable that takes the value j if individual i is employed in occupation O_j, and the probability $P(Y_i = j)$ that individual i is employed in occupation j. It follows that the probability of belonging to any occupation $j \in k$, is given by

$$P(Y_i = j) = \frac{\exp(\beta' X_{ij})}{\sum_k \exp(\beta' X_{ik})} \qquad (1)$$

[1] We have identified that our modelling procedure may suffer from the following problems. There is likely to be asymmetric information in recruitment since important individual characteristics cannot be observed by employers at the recruitment stage. In addition, there is likely to be missing observable data in terms of the econometric modelling. These and other factors can explain the existence of mistakes in the matching process.

where X_{ij} is a vector of educational and productivity related characteristics that workers can hold that are associated with the occupation O_j , the nature of that association being imperfectly described by β'. The extent of random inefficient matching between characteristics X_{ij} and the requirements of occupation O_j is given by ε_j. The β' parameters represent the (imperfect) job matching relationships between qualifications and job requirement of a meritocratic society, or as close as it is possible to get given there will be errors and inefficiency in the matching process. Assuming that the *J* error terms are independent and identically distributed with the Weibull distribution, McFadden (1974) has shown that under these conditions it is possible to estimate equation (1) as the multinomial logistic function. The condition $\beta_K = 0$ is imposed to identify the other parameters in the equation.

Having established the parameters of a meritocratic allocation system from the above model, we can predict an individual's likely occupation given their characteristics X_i, and compare this with their actual occupations, O_{ij}, for particular groups. An individuals predicted occupation $\hat{O}_{ij}$, is defined as that with the highest predicted probability $\hat{p}_{ij}$ from the *k* occupation categories. This should give an estimate of bias from the way job matching takes account of non-productivity characteristics, in particular here, ethnic origin and gender. In selecting the predicted occupation with the highest probability, the method has the advantage over the earlier mean-mode distribution method since there is nothing ad hoc about it.

However, there is the need to resolve some practical assumptions before these calculations can be undertaken. To calculate over (or under) education, it is necessary to rank occupations in a hierarchy. Assuming observed occupation O_1 is the highest ranked in terms of qualifications and skills required then $O_1 > O_2 > \ldots > O_k$. The first column of Table A2 in the Appendix

displays the actual occupational ranking from top to bottom used throughout the paper. Occupations are ranked using average occupational earnings. Hence a higher paying occupation is deemed `better' than a lower paying occupation, using average one digit occupational gross hourly pay.

We can then define over education E_v, and under education E_u as follows:

$$E_V = 1 \text{ if } \hat{O}_{ij} > O_{ij}$$

$$E_U = 1 \text{ if } \hat{O}_{ij} < O_{ij}$$

Clearly the initial estimation of the β vector in equation (1) is likely to influence the amount of over education, and the population used for this estimation is therefore an important issue. In a perfect meritocratic society it would be appropriate to use the whole population of men and women to estimate the base parameters. However, we know that the labour market is at least partially segmented by gender and that women are over represented in lower level occupations. It is likely that over education will be greater for women if they are judged against a meritocratic occupational distribution which includes men's actual occupations, as compared with using women's occupations only. On the other hand, using solely women's (or men's) occupational distribution as the norm for the gender is accepting the existing labour market discrimination, and partially factoring it out of the calculations. We have done the calculations in the two ways in order to see the extent of over education within gender compared to between gender groups. The β's are calculated based on the whole workforce first, men plus women; then they are estimated again based on men's or women's occupations separately. In addition, as well as using only productivity-related characteristics for the X characteristics, we also estimated the extent of over education including a gender dummy, in

order to examine the effects of controlling out some of the known labour market gendered preferences and discrimination against women.

We would argue that this new method has a number of benefits over the earlier mean-mode method (method 3). Firstly it allows for the use of a range of education measures, and not just one integer education score. This should provide a better modelling outcome of the relationship between occupations and educational qualifications. It is also more suited to a society where 'years of education', often used as the measure of education in the mean-mode method, is not a good distinguisher between the educational levels reached by individuals, or the jobs that they hold. In addition, our method allows for the addition of other productivity-related indicators to be included in the model, as implied requirements of the job. This method also allows for the points made by Sicherman, concerning the importance of experience and training as components of human capital, to be incorporated into the analysis.

4. Quarterly Labour Force Survey data (QLFS)

The Quarterly Labour Force Survey is conducted by the Office for National Statistics. Since 1992 the Quarterly LFS (QLFS) has had a pseudo-panel design where each sampled address is interviewed for five quarterly waves. Each quarter, face-to face interviews are achieved at about 59,000 addresses with about 138,000 respondents offering a high response rate (eg. 77 percent in 2002).

The QLFS also provides extensive information on employment and unemployment, as well as qualifications. These core questions are asked consistently each year as well questions on ethnicity, country of birth and year of arrival in the UK. The QLFS sampling design and large sample size mean that reliable estimates can be obtained for ethnic minorities by combining

data for several years.[2] We have used unique information on individuals observed in their first wave over a 4 year time period between 2001 and 2004, primarily to provide sufficient cases for the detailed analyses that follow, and to take advantage of the post 2000 detailed occupational categories. During this period there has been a large increase in qualifications amongst women generally and for all ethnic groups (Lindley et al, 2004), a period of sustained economic growth in the British economy reflected in steady declines in levels of unemployment.

By using the QLFS we are restricted to the definitions of ethnicity used in that survey. The QLFS changed its questions on ethnicity in Spring 2001 to reflect the new UK 2001 Census categories. Respondents were first asked to classify their own ethnicity into one of six categories: White, mixed, Asian, Black, Chinese or other. Following this a second set of questions disaggregated further some of these categories. For example, those respondents who classed themselves as `Asian' were asked whether they thought themselves to be Indian, Pakistani, Bangladeshi or other Asian. Similarly, `Black' respondents were asked whether they thought themselves to be Caribbean, African or Black other. Those respondents who classed their own ethnicity as `mixed' were asked further whether they thought themselves to be; White and Caribbean; White and African; White and Asian or other mixed.

In order to obtain sensible sample sizes we group the two mixed race categories `White and Caribbean' and `White and African' into 'Black Other', and also `White and Asian' and `other mixed' into a single 'other non-White' composite group.[3] The unweighted sample numbers for each ethnic group after pooling data are as follows: White (162026), Indian (2843), Pakistani

[2] The LFS uses proxies where interviews cannot be obtained for some household members. Overall, 32% of interviews are by proxy but for non-White groups this rises to about 38-40%. Proxy interviews are generally more likely for men than for women and for younger people than for older people. It is therefore likely that information about minority groups is recorded less accurately in the LFS than for White groups.
[3] A fuller discussion of this process is available in Lindley et al (2004).

(1086), Bangladeshi (366), Black African (1136), Black Caribbean (1480), Black Other (525), Chinese (544) and Other (2515). In this paper we use unweighted data for the UK.

The occupational categories used for this analysis were the one-digit SOC(2000) codes. This provided 9 occupations. The mean real hourly gross earnings for each code were calculated to check they were significantly different from each other.[4] Due to the overlap in these distributions, skilled trade (code 5) and process and plant operatives (code 8) were combined to give 8 occupation codes for the multinomial estimation, as detailed in Table A2.[5]

We included in the *X* vector of equation (1) age in years and its square, as well as a set of educational qualification measures. The first specification contained 41 mutually exclusive highest qualification dummies.[6] Given that all foreign qualifications are coded as `other' regardless of their level, we also generated another variable intended to capture those with a foreign higher qualification.[7] Our second specification contained 6 highest qualification dummies using the NVQ level scale, compared with the reference group of no qualifications. In a subsequent specification, we included a full set of 27 dummy variables for `actual' qualifications held, where these are not mutually exclusive. These ranged from a PhD to Youth Training Certificate or any other qualification.[8] Again a foreign qualification dummy was included in both of these latter specifications.

Unfortunately, the Labour Force Survey does not contain accurate measures of work experience. Tenure in the current job was available and this was included as a set of 7

[4] All hourly earnings were deflated using into common prices using the Retail Price Index.
[5] Skilled trade occupations had an average mean hourly wage of £8.73, whilst that for Process and Plant workers was £7.67. The two groups were combined to maximise sample sizes, where these were particularly small for ethnic minority women.
[6] These are based on the QLFS variable `HIQUAL' and are listed in Table A5 of the Appendix.
[7] This is based on whether the respondent was born overseas, left full-time education aged over 18 and before they arrived in the UK.
[8] These are formulated using the QLFS variables QUALS(01-23) and HIGHO and are listed in Table A6 of the Appendix.

gradually increasing dummy variables compared with having been in the current job for less than 3 months. Age and age square were entered as additional imperfect proxies for work experience. However, age is less satisfactory as a measure of women's work experience. To compensate for this, a child dummy was also entered for any dependent children resident in the household. This was intended to capture the lower level of work experience associated with family formation for the majority of mothers. The model was estimated with and without this child dummy to test out the sensitivity of the results to its inclusion. We also searched the LFS data for measures of skills which might be productivity related. We included, as proxies for skills, one dummy variable where the individual had job-related training in the past 13 weeks. Other off-the-job training measures were also included but dropped since they failed to be significant. Lastly, having supervisory duties in the current job was also included as an additional dummy indicator for skills. We anticipated this would capture lower levels of management skills.

White women and men were certainly not uniformly in the best occupations throughout (Table A3 in the Appendix). The groups with the highest percentages of employed women in professional occupations were Chinese women and Indian (around 14%), followed by Pakistani (12.8%) and Other non-White ethnic groups (12.8%) compared to 10.4 per cent of employed White women. Employed White women had the highest percentage employed in managerial occupations (9.2%). Employed Bangladeshi women had the highest percentages employed in the lower level occupation, sales (21.6%) and Black African women had the highest percentage in personal and protective (21.0%) occupations.

The position of employed White men relative to minority ethnic men was similarly mixed but often the employed White men were employed is less qualified jobs compared to minority ethnic men. Compared with 12.4 percent of employed White men in professional jobs, there

were 23.1 percent of Chinese and 21.6 percent of Indian men, but 9.6 percent of employed Black Caribbean and 9.2 percent of Black Other men. White men did have the highest percentage across all ethnic groups in managerial occupations (18.4%). Employed Black African (28.3%), Bangladeshi (24.5%) along with Black Other men (22.9%) had very high percentages in the lower level elementary occupations.

The distributions of employed ethnic groups by highest educational qualification and schooling are displayed in Table 1. Panel (i) shows highest national vocational qualification (NVQ levels) percentages by ethnicity and gender, whilst panel (ii) compares years of schooling by ethnicity, immigrant status and gender. Generally, panel (i) supports earlier studies for graduates, since Chinese, Indian and Black African minorities are shown to contain very high proportions with degree qualifications. The empirical literature suggests that these are often in science, engineering, technology and ICT subjects (Jones and Elias, 2005). Taking NVQ levels 4 and 5 together, 46.1 percent of employed Chinese women and 41.7 percent of Chinese men had at least a first degree, 42 percent of Black African women and 41.7 percent of Black African men also had at least a first degree followed by 33.6 percent of Indian women and 38.2 percent of Indian men with this qualification. These figures compare with lower rates of degree qualifications in other groups, 28.5 percent for White women and 27 percent for White men. It is worth noting that employed Bangladeshi (25.8%) and Pakistani (30.6%) women in this sample, small in number, had higher proportions with a degree than employed Bangladeshi (18.6%) and Pakistani (25.6%) men respectively. Bangladeshi (32.7%) and Pakistani men (23.3%) also had very high proportions, relative to other groups, with no qualifications. Black Caribbean men (19.2%), but not Black Caribbean women (31%), had the lowest percentage with at least a degree qualification. The extent of foreign qualifications varied considerably by ethnic origin, Black African and Other ethnic men (18.0%), Black

African women (14.2%) and Other ethnic women (16.7%) having the highest percentages and also potentially containing the more recent migrant groups to Great Britain.

Panel (ii) of Table 1 shows the percentage of those with only foreign schooling (ie no British schooling at all) by ethnic group (3% and 2% for white men and women). Percentages are much higher for Black Africans (around 64%), Other non-whites (around 56%) and Chinese (50% and 42% for men and women respectively). This shows the importance of controlling for foreign qualifications when comparing ethnic differences, especially if foreign qualifications under valued in the UK labour market.

Furthermore, there are substantial differences in the British and foreign schooling levels across ethnic groups. Panel (ii) shows that many minority ethnic groups have more British schooling, on average (Black African have around 16 percent, whereas Indian, Pakistani, Bangladeshi, Chinese and other have around 15 percent) compared to white men and women (13 percent).[9] This supports the findings from panel (i). However, comparing British and foreign schooling averages, white men and women have around 2 years more foreign schooling (around 15 percent) than British schooling (around 13 percent), on average. This is not the case across other ethnic groups where foreign schooling levels are sometimes slightly lower than British schooling (Black Caribbean men and women, Black African women and Indian women). This suggests that calculating over-education based on mean levels of average schooling for immigrants may be misleading.

[9] It should be noted that workers with some British schooling and some foreign schooling are excluded from these averages.

5. Comparing the methods

In this section we consider the amounts of mismatch calculated using our new method compared with a comparable specification of the mean-model method. Following Battu and Sloane(2004) we use the mode integer scale measure of (NVQ level) qualifications, where over-education is defined having an NVQ level qualification which is higher than the one digit mode NVQ qualification level (we call this the mode-NVQ method). We also use the mean years of schooling method (referred to as the mean-schooling method) as per Lindley and Lenton (2006) where over-education is defined as having at least one standard deviation more years of schooling compared to the one digit average. Our percentages differ from those used in these studies since we calculate using our one digit SOC groups (as detailed in Table A2) and we use our QLFS data for 2001-2004.

For our new multinomial logit methods, we predict occupations based on schooling, highest and actual qualifications held. First we use years of schooling. Second we use 42 highest qualification binary dummies (including a category of foreign qualification). Finally we use 27 actual qualification dummy variables. Unfortunately it was possible to estimate the multinomial model using the 7 highest NVQ variables whilst excluding the other measures of human capital, because there is not enough explanatory variation to predict into the 8 one digit occupational categories. All calculations are here estimated using a pooled sample of male and female employees.

Table 2 compares over education mismatch for each ethnic group using all methods, where panel (i) contains men and women together and panel (ii) considers them separately.[10] As was found by Battu et al (2000) and also alluded to in Table A1, the mode-NVQ method produces the lowest levels of over education; only 26 per cent of all employees were over educated

[10] The multinomial coefficients for these models are contained in Tables A4-A6 of the Appendix.

using the mode-NVQ method compared with 34 percent using the mean-schooling method. The multinomial method using years of schooling provides much higher levels of over-education 42 percent across all ethnic groups, although using qualification dummy variables lowers over-education levels; the 42 highest and 27 actual qualification dummies provide estimates much more similar to the mean-schooling method (36 and 37 percent for highest and actual qualifications overall).

Ethnic differences are also sensitive to the method of estimation. The mode-NVQ method provides much smaller differences between ethnic groups compared to the mean-schooling method, although they both provide qualitatively similar results in terms of the order since Black African display the highest levels of over-education, followed by the Chinese, Other ethnic group, Pakistani, Indian, Bangladeshi, Black Other, Black Caribbean and White.

The multinomial methods also provide methodological differences. Using years of schooling provides much higher levels of over-education (42 percent overall) compared to using 42 highest dummy variables (36 percent overall) and actual qualification dummies (36 percent overall). However, using highest qualification or actual qualification dummies results in much lower ethnic differences compared to the mean-schooling method and also the multinomial logit with years of schooling. Using mean-schooling, Black Africans show 76 percent over-educated compared to 32 percent for whites, providing a differential of 44 percentage points. This differential halves to 26 percentage points using the multinomial highest qualification method (since 59 percent of Black African workers are now over-educated compared to 33 percent for whites). Similarly White-Chinese differences fall from 40 percentage points to 12 percentage points and White-Indian from 34 percentage points to 7 percentage points using the new multinomial method and highest qualification dummies. These fall still further using actual qualification dummies to 18 percentage points for White-Black African, 14 percentage

points for White-Chinese and 2 percent for White-Indian workers. This is likely to be a consequence of higher levels of foreign schooling on average compared to British attained schooling which cannot be captured using the mean-schooling method. In fact, the ethnic differentials obtained under the multinomial actual qualifications method are smaller than those obtained under the mode-NVQ methods where these are 18 percentage points for White-Black African, 18 percent for White-Chinese and 5.3 percent for White-Indian workers. The clear advantage of using the multinomial method is it's versatility since other human capital measures can be included to help to explain the ethnic gap.

Panel (ii) provides a similar story, although over-education is generally much higher amongst women and female ethnic differences are generally much lower. Using years of schooling, the multinomial method provides very similar male estimates to using the mean approach (34.4 and 32.5 percent respectively), whereas the multinomial method predicts much higher over-education for women (49.7 compared to 35.6 percent for female mean-schooling).

For both men and women the extent of the disadvantage differs across methods. Using the mean-schooling method provides very high ethnic differentials of 49.4 percentage points for White-Black African, 42.5 percentage points for White-Chinese and 36.7 percentage points for White-Indian men, compared to using the multinomial dummy methods where these figures fall to 30 percentage points for White-Black African, 9.6 percentage points for White-Chinese and 7.3 percentage points for White-Indian men. These are more in line with the mode-NVQ method where comparative percentage points are 27.6, 8 and 19.1 for White-Black African, White-Chinese and White-Indian men respectively.

Women show lower levels of ethnic difference compared to men. For example, using the multinomial highest qualification dummy method provides White-Black African differentials

of 16 percentage points (compared to 30 percentage points for men), White-Chinese differentials of 7.5 percentage points (compared to 9.6 percentage points for men) and White Indian differentials of 6.4 percentage points (compared to 7.3 percentage points for men). Using the multinomial with actual qualifications provides a negative differential for Black Caribbean women (40.2 percent), Black Other women (37.9 percent) and Indian women (42.5) compared to white women (42.9 percent), where minority ethnic groups actually experience lower rates compared to white women.

In summary, comparing across methods, the multinomial method provides lower estimates when using dummies instead of years of schooling, although predictions are similar to those estimated using the mode-NVQ method. Ethnic differences tend to be substantially lower than the mean-schooling method and more similar to the mode-NVQ method using both highest qualification and actual qualification dummies, although some of the variation in results may be a consequence of small sample sizes. The multinomial method is a more persuasive measure in tending to place levels of women's over education more systematically higher than those of men's as well as having other benefits.

6. The job matching process

We now consider the results from adding our other productivity-related independent variables (age, age squared, household has at least one child, employment tenure dummies, skills and supervisory duties) to the multinomial models. Table A7 provides the coefficients using actual qualification dummies and productivity related controls, Table A8 uses highest NVQ dummies, where the 42 highest qualification dummies have been aggregated into 6 NVQ dummies as per Table 1. Both of these specifications have been estimated using a pooled sample of men and women.

Generally, there were relatively small differences between the estimated coefficients for the common variables across the two models, but the goodness of fit was better for the model containing all qualifications compared with only the highest qualification. Using the full set of actual educational qualifications (Table A7) made the relationships between educational qualification and occupation much harder to generalise than is the case for highest qualification (Table A8) where higher levels of qualifications had the most significant and strongest links with the highest occupation groups, and had a progressively weaker relationship with the lower levels of occupations. The skilled trade plus process and plant occupations often stood out with a much smaller coefficient in a row of gradually declining coefficients for the higher levels of educational qualifications. The managerial occupation also had a slightly lower level of association with higher educational qualifications than the associate professional occupation.

Within each occupation, the likelihood of being in that occupation clearly declined as the highest level of educational qualifications declined especially for the top three occupation groups, professional, manager and associate professional occupations.

As current job tenure increased, it was more likely that the individual would be in one of the higher occupation groups. Age, as another proxy measure of experience was also positive and highly significant, highest with managers, with a negative declining effect from the negative and significant age squared term. Sales jobs stand out in this array of occupations as having a higher employment turnover and younger workforce. This coincides with intuitive expectations, even despite having excluded full-time students from the sample.

The child dummy variable did act as a work experience measure for women (Table A9). It had significant negative coefficients on the likelihood of being in all occupations except personal

and protective and sales occupations. For men, the child dummy had significant and positive values on the likelihood of being in professional, managerial and skilled trade jobs, a negative and significant coefficient on being in administrative occupations, but largely insignificant coefficients elsewhere.

The supervisor coefficient was always positive and significant and highest for the manager occupation, followed by the professional then associate professional occupations. In fact, it seems more likely that it is capturing some sort of line management function and that such functions apply across all occupations, although obviously more predominantly in jobs labelled 'manager', and possibly more so in the higher occupation groups and least in personal and protective occupations. Using training in the past 13 weeks as a skill indicator, this varied considerably in size across the occupations, but was always positive and significant. Training tended to be more associated with professional, associate professional and personal and protective occupations. The personal and protective occupations may require more regular training to keep abreast of legal duties and increasing security threats in society. Training in the past 13 weeks had its lowest sized coefficient in skilled trade occupations. This is probably a change since the days of the apprenticeship system, and it may be reflecting the movement of training in `skilled trade' skills out of workplaces, under the old apprenticeship system, and into formal (further) education centres.

A further set of models were estimated on the separate gender groups, as described above. The calculations of over and under education were carried out on all of the various model varieties, although the full set of coefficients for all these models are not reported in the paper. In addition, one set of models included gender as an additional dummy variable. It was expected that including gender as a dummy would, like estimating the models on separate groups of men and women, would reduce the amount of over education, particularly of women.

7. Measures of over education

Table 3 compares the over-education estimates using both the full range of actual dummy qualifications and also highest NVQ dummy qualifications (as detailed in Tables A7 and A8). We have also included in Table 3 those estimates obtained using actual qualifications only, since this shows the lowest degree of ethnic difference in Table 2.

The first column in Table 3 shows the estimates of male over-education based on using actual qualification dummies in the multinomial logit, which can be directly compared with the second column which includes the other productivity related variables. First, including the other productivity controls reduces the overall extent of over-education for women (43.1 to 38.2 percent) whereas this remains virtually the same for men (30.4 to 30.7 percent). In fact, including productivity controls lowers over-education rates across virtually all minority ethnic men and women, with Black Caribbean men being the one exception (31.1 to 34.6 percent).

Second, for men, controlling for other productivity related differences has a different effect on the white/non-white differential across ethnic groups. In most cases the differential is reduced and in some cases it becomes negative; White/Black Other (From 4.1 to -0.8 percentage points) White/Indian (from 5.2 to -0.6 percentage points), White/Bangladeshi (11.9 to -1.1 percentage points). For women the differential is reduced for White/Black Other (-5.0 to -2.6 percentage points), White/Chinese (12.0 to 5.0 percentage points) and White/ethnic other (6.3 to 1.1 percentage points) but for some groups the ethnic differential moves in favour of whites (White/Black Caribbean moved from -2.7 to 1.4 percentage points and White/Indian moves from -0.4 to 0.9 percentage points) whereas for others it moves in favour of non-whites (White/Black African moves from 8.4 to -8.6 percentage points, White/Pakistani moves from 4.2 to -2.9 percentage points and White/Bangladeshi moves from 2.5 to -6.3 percentage points).

Comparing the second and third columns in Table 3 shows that replacing actual qualification dummies with highest NVQ dummies slightly increases the estimates of over-education for most men and women (Pakistani and Bangladeshi men are two exceptions since over-education moves from 32.1 to 31.9 percent for Pakistani men and 29.4 to 25.3 percent for Bangladeshi men). Using highest NVQ dummies results in similar ethnic differentials as those attained using actual qualifications where the only exceptions for men are White/Black Other (from -0.8 to 0.6 percentage points), White/Pakistani (from 1.6 to -4.0 percentage points) and Bangladeshi (from -1.1 to -10.1 percentage points). For women, changing from actual qualifications to highest NVQ has the largest affects on the ethnic differential for Black Caribbean and Black African women, since the White/Black Caribbean differential is now 3.6 percentage points (compared with 1.4 using actual qualifications) and the White/Black African differential is 16.8 percentage points (compared with -8.6).

From Table 3, the single equation estimates show that men are always less over educated for their occupations than women. This gender relationship also coincides with earlier calculations (Sloane et al, 1999). Table A10 in the Appendix shows that the gender gap was closed somewhat when separate gender models were estimated. From Table 3 we can also see that including other productivity related controls often closes the ethnic gap between rates of over-education. Regardless of which educational measure is used, only Black Caribbean, Black African, Chinese women and Other-Ethnic workers exhibit higher rates of over-education compared to Whites once these productivity related measures are taken into consideration. However, it must be remembered that all minority ethnic group calculations were based on considerably smaller sample sizes than applied to the White employees, although by pooling men and women, these samples were not prohibitively small. Figures 1

and 2 provide the ranges of over-education estimates and the mean across all estimates by ethnic group.

In Figure 1 the range of female over-education is between 27.8 and 61.6 percent. There were many similarities across the values in Black Caribbean, Black Other, Indian, Pakistani and Other non-White women, in comparison to White women. These all had mean percentages of over education around 40 percent. In terms of labour market bias in job matching by ethnicity, mainly Black African and Chinese women in the UK appear to suffer greater rates of over education than White women, and Bangladeshi women, and Pakistani women to a lesser extent, experience less over education than White women. Employed Black African and Chinese women were the groups with the highest percentages of degree and higher degree level qualifications but also Black African women had the highest proportion of foreign qualifications. It would seem that the labour market treatment of the highly qualified women in these two groups is worse than the same qualifications held by other groups. In addition there may be elements of foreign qualifications being treated in a more erratic way than other qualifications because of employer's uncertainty about their quality.

Male rates of over education are displayed in Figure 2. The range of over-education is between 25.3 and 54.2 percent. White and Indian men have the lowest overall mean percentage of over education at 32.6 or 34.4 percent. As with women, therefore, the highest rates of over education were among Black African men (54.2%), who also had, like Black African women, very high rates of degree level qualifications and foreign qualifications.

In the case of both women and men, the overall extent of over education has similarities with earlier studies. However, the differences between ethnic groups and in comparison with White employees are far less than those found in Lindley and Lenton (2006) although more parallel

to those found in Battu and Sloane (2004). In the case of Lindley and Lenton, their use of years of schooling and the mean method probably explains much of the larger amounts of over-education, compared with our alternative method, better measures of actual education and controlling for some skills. Inclusion of more skill differences in models may well reduce further the amount of over education. However, we still find sizeable rates of over-education after controlling for work experience and skills, contrary to Sicherman's claim.

8. Other explanations

This and other studies have found reasonably large amounts of over education in the British labour market varying by ethnic origin and gender. Gender differences have been found to outweigh differences by ethnicity, except in the case of Black African men and women and Chinese women, who were outliers from the rest. Clearly it is controversial to attribute these differences to labour market discrimination. It is necessary to explore some of the alternative explanations. In this section, we consider a number of dimensions of difference available in our LFS data which could potentially explain some of the ethnic and gender differences we found; these are part-time work as a gender and ethnic difference, factors that indicate the differences may be temporary (arrival times in the UK, and subsequent occupational mobility) and also differences in the subject of education measures. Language fluency is another characteristic which may be important, but unfortunately we do not have data to examine this issue.

8.1. Part-time work.

Large proportions of women work part in Britain, women with children often accept downward occupational mobility in exchange for the convenient hours and location of part-time jobs, (Dex, 1992). We expect women to be more likely than men to suffer over education, even if this is temporary, but potentially those who work part time to suffer more

over education than those who work full time. Since minority ethnic groups work part time to varying extents (Lindley et al, 2004), part-time work may also help to explain ethnic differences in the extent of over education.

Table A11 demonstrates that over-education rates for women in part-time work were indeed larger than those for women in full-time employment (43.7 percent overall, compared with 34.1 percent for full-time women). In fact women's full-time over-education rates are much more similar to those for men (in the second column of Table 3) so that the higher female over-education rates are partially explained by a large percentage of female part-time workers (42.7 percent of the female workforce is employed part-time). This suggests that women may be more likely to accept a part-time job for which they are over-qualified because lower skilled jobs provide more flexibility in terms of hours of work.

Over-education rates for part-time women are again higher for Black African (50.9 percent) and Chinese (52.7 percent) women compared to the other ethnic groups (43.8 percent for Whites), even though it is in fact white women that exhibit the highest percentage of part-time workers (43.2 percent of the white female workforce). This may suggest that some minority ethnic groups are more likely to drop out of the workforce than go into part-time work during the chid rearing years, although Chinese (40.6 percent) and Pakistani (42.2 percent) women also exhibit high part time rates.

Full-time over-education rates are still relatively high for Black African women (41.5 percent) but Chinese full-time women exhibit rates more in-line with the other groups (29.7 percent). This suggests that the White/Chinese female over-education differential is a consequence of more over-educated part-time workers, whereby white women may find it relatively easier to

find a part-time job commensurate with their qualification level. This is not the case for the White/Black African female over-education differential.

8.2. Recent arrival in Britain

Over-education may be related to being the last migrant group to enter the country, and consequently being faced with accepting a lower paid job that existing inhabitants do not want to do. The first column in Table A12 demonstrates that 0.3 percent of the sample arrived in the UK within the last two years of the survey (between the start of 2003 and the end of 2004). Recent arrival rates are highest for Bangladeshi (3.8 percent), Black African (3.4 percent) and Other non-whites (3.6 percent) compared to Whites (0.2 percent). These percentages are very small but may contribute to explaining the observed ethnic differences in over-education.

8.3. Career mobility.

Some careers require individuals to enter at the lowest rung of the ladder, to acquire job related skills and experience and therefore work alongside non-career employees, before being allowed to move into more suitable positions. Also recent migrants may be willing to take jobs below their qualification level when they first arrive in order to attain language and cultural attributes which will eventually make them more successful in the UK labour market. Consequently we have generated a measure of upward occupational mobility based on movement up the occupational scale as detailed in Table A2 during the relatively short period observed in the data (1.25 years). Table A12 shows a substantial measure of upward occupational mobility (4.9 percent overall), varying by ethnic origin. Minority ethnic group mobility is generally lower than that for whites (5.0 percent), with the lowest being for Chinese (2.1 percent), Bangladeshi (2.2 percent) and Black African (2.6 percent).

8.4. Subject of degree

According to Jones and Elias (2005) Black African and Chinese students were greatly over–represented, in comparison with White and other ethnic groups in SET (science, engineering and technology) subjects at university in 1996-97, and even more so by 2001-2002. These are subjects which often give a wage premium in the labour market. Table A12 suggests that this may be the case for engineering graduates since only 5.8 percent of Chinese graduates and 4.6 percent of Black African graduates have an engineering degree, compared to 7.0 percent for White graduates. However, 5.3 percent of Chinese graduates and 5.7 percent of Black African graduates have a Medical degree, compared with 2.1 percent for White graduates. In fact, all minority ethnic graduates are over-represented in terms of Medical degrees and also in Medical related degrees, although they are under-represented in the arts and in education.

Studies of the UK minorities' educational qualifications have shown that choices of university also varied by ethnic origin (Connor et al, 2003, Table 4.1, p.61). Compared with 33 per cent of White university entrants (men plus women) who went to pre-1992 universities, with the more prestigious reputations, only 13 per cent of Black African students and 24 per cent of Chinese and Asian other students entered these older universities, the majority of the rest going to post-1992 universities (84% of Black African and 68% of Chinese students). Ethnic variations in degree classifications were also found in Connor et al's study (2003, Table 5.3, p.75) of 1998/99 HESA higher education students' data and by Jones and Elias (2005). Black African and Chinese students in 1996-97 and 1998-99 were far less likely than White university graduates to obtain a first or upper second class degree.

8.5. The effect on over-education rates.

Table 4 provides over-education rates estimated with the multinomial logit method whilst including both productivity related measures, but also extra controls that might help to explain ethnic differences in over-education. We include a dummy variable that equals 1 if the worker

arrived in the UK within the last two years of the survey and zero otherwise in order to measure whether a respondents lacks UK-based labour market experience. We also include a binary dummy variable to capture upward mobility over the subsequent four quarters after the individual's observed occupational group. We used actual qualifications but replaced the `has degree' dummy with 19 binary variables to capture variations in the subject of the degree.

Comparing the first and second columns, as well as the third and fourth columns shows that including these extra controls does not substantially change the over-education rates for White workers. These are around 37-38 percent (30-29 percent) for the single equation and 34 percent (31 percent) for the separate equation methods for women (men). However, the White/Black African gap increases in the case of single equation estimates (from 8.6 to 10.3 percentage points for women) but less so when separate equations are estimated (9.7 to 10.8 percentage points). The White/Chinese gap is closed slightly for women and remains the same for men, using separate equations. White/Black African and White/Chinese differences remain unexplainably higher than Whites, even after taking other ethnic differences into account. Interestingly Bangladeshi men and women, as well as Indian men exhibit lower rates than their White counterparts. This situation is reversed when controls for mobility, recent arrival and subject of degree are included in the matching process.

9. Conclusions

Our findings suggest, as do earlier studies, that there are plenty of job holders (women more so than men), who do not appear to be matched appropriately to their jobs given their educational qualifications and their work experience and skills. In part, the high level of mismatch overall is undoubtedly because we do not have sufficient detail about employees' skills and productivity characteristics, nor about their occupations, to be able to test out this matching process at a sufficiently fine level of detail. It is likely that the labour market

operates with substantial elements of inefficiency although exactly how much is difficult to identity. However, this should affect all ethnic groups of employees to a similar extent.

We found that the extent of over education is less for men than for women and more of a problem for women employed in part-time than in full-time jobs. The higher rates for women are what Battu and Sloane attributed to women facing constraints on their labour force participation to a greater extent than men, for example, constraints in the distance they are prepared to travel to work. While there is some variation by ethnic origin in the extent to which appropriate matching has taken place, the extent of mismatch is far less for men than some earlier studies suggested, across a nationally representative sample of the whole workforce. Black African men and women and Chinese women had very much larger over education rates than White men and women respectively. Black other, Pakistani and Bangladeshi women, on the other hand, appear to do slightly better than White women in the matching, given their educational endowment, although this situation reverses for Bangladeshi women once degree subject, career mobility and recent arrival are taken into consideration. A range of explanations were explored in an approximate way to see if they help to explain these ethnic group differences (Table 4) although differences between White and Black African men and women remain unexplainably high.

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Table 1. Distribution of ethnic groups by highest educational qualifications and schooling, for women and men.

(i) Panel (i) percentages by highest NVQ level

Highest educational qualifications	White		Black Caribbean		Black African		Black Other		Indian		Pakistani		Bangla deshi		Chinese		Other Non-White	
	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M
NVQ Level 5	4.7	5.3	3.7	4.6	7.4	12.9	5.9	4.6	6.8	10.2	5.5	6.4	3.1	5.2	15.1	18.3	7.8	10.7
NVQ Level 4	23.8	21.7	27.3	14.6	34.6	28.8	22.8	15.3	26.8	28.0	25.1	19.2	22.7	13.4	31.0	23.4	30.9	24.7
NVQ Level 3	16.9	29.8	16.7	29.3	11.7	12.8	19.1	21.6	15.3	16.2	17.3	14.2	22.7	7.4	11.5	12.5	11.7	13.4
NVQ Level 2	28.0	18.3	27.7	19.7	10.7	8.8	28.1	23.4	15.3	10.4	27.5	13.5	25.8	9.7	5.6	7.3	11.6	7.9
NVQ Level 1	11.4	11.1	11.3	14.3	14.5	13.2	10.9	15.8	13.4	11.4	9.9	14.2	12.4	19.3	11.1	10.7	14.0	13.8
Foreign	0.7	0.7	0.8	1.10	14.2	18.0	0.3	2.7	9.7	10.2	4.2	9.2	3.1	12.3	10.7	11.7	16.7	18.0
None	15.2	13.1	12.56	16.51	6.9	5.4	12.9	16.2	12.8	13.5	10.5	23.3	10.3	32.7	15.3	16.5	8.2	11.41
Total %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
N	81270	80756	844	636	581	555	303	222	1347	1496	382	704	97	269	271	273	1200	1315

(ii) Panel (ii) Average years of Foreign and British schooling

	White		Black Caribbean		Black African		Black Other		Indian		Pakistani		Bangla deshi		Chinese		Other Non-White	
	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M
Foreign Schooling only %	2.7	2.3	18.9	22.2	64.4	63.6	13.9	13.5	37.8	37.6	16.8	33.9	14.4	42.0	50.2	42.1	56.2	56.5
Average years of schooling:																		
British schooling only	13.3	13.3	13.9	13.5	16.2	16.2	13.6	13.3	15.3	15.2	14.8	15.1	15.3	15.3	15.4	15.3	15.2	15.2
Foreign schooling only	15.3	15.6	12.5	12.5	15.3	16.4	13.3	14.1	14.5	15.7	14.1	14.2	14.6	13.8	15.2	15.5	15.2	15.7
N	81270	80756	844	636	581	555	303	222	1347	1496	382	704	97	269	271	273	1200	1315

Sample: All employees (excluding the self-employed and full time students) using the LFS 2001 to 2004.
W- women. M- men.

Table 2. Estimates of over-education, by method, gender and ethnicity.

Panel (i) Both Men and Women

Ethnic origin	Mode-NVQ	Mean-School	MNL Years of Schooling	MNL Highest Qual Dummies[a]	MNL Actual Qual Dummies[a]
White	25.4	32.3	41.1	35.5	36.3
					[162.06]
Black Caribbean	25.7	37.6	45.7	33.9	36.3
					[1480]
Black African	43.8	76.1	72.5	58.5	54.6
					[1136]
Black - other	28.6	41.5	47.4	38.7	36.2
					[525]
Indian	30.7	66.1	54.2	42.2	38.6
					[2843]
Pakistani	31.8	59.2	58.3	42.7	42.9
					[1086]
Bangladeshi	29.2	58.2	57.7	39.3	42.6
					[366]
Chinese	43.6	72.2	57.7	47.1	50.0
					[544]
Other	31.9	68.2	60.8	49.3	46.9
					[2515]
Total	25.8	34.1	42.0	36.0	36.7
					[172521]

Panel (ii) Men and Women separately

	Men					**Women**				
Ethnic origin	Mode-NVQ	Mean-School	MNL Years of Schooling	MNL Highest Qual Dummies[a]	MNL Actual Qual Dummies[a]	Mode-NVQ	Mean-School	MNL Years of Schooling	MNL Highest Qual Dummies[a]	MNL Actual Qual Dummies[a]
White	21.6	30.4	33.1	33.2	29.7	29.1	34.1	49.0	37.8	42.9
					[80756]					[81270]
Black Caribbean	23.1	36.3	40.7	32.1	31.1	27.6	38.5	49.4	35.3	40.2
					[636]					[844]
Black African	49.2	79.8	70.8	63.2	58.0	38.6	72.6	74.0	53.8	51.3
					[555]					[581]
Black - other	30.2	38.3	44.6	39.2	33.8	27.4	43.9	49.5	38.3	37.9
					[222]					[303]
Indian	29.6	67.1	49.9	40.5	35.1	31.9	65.0	59.1	44.2	42.5
					[1496]					[1347]
Pakistani	29.4	59.1	56.9	41.6	40.6	36.1	59.4	60.7	44.8	47.1
					[704]					[382]
Bangladeshi	27.4	56.5	56.1	37.2	41.6	35.1	62.9	61.9	45.8	45.4
					[269]					[97]
Chinese	40.7	72.9	51.6	42.8	45.1	46.5	71.6	63.8	45.3	54.9
					[273]					[271]
Other	32.1	68.8	58.4	47.7	44.9	31.8	67.4	63.5	51.3	49.2
					[1315]					[1200]
Total	22.3	32.5	34.4	33.9	30.4	29.3	35.6	49.7	38.2	43.1
					[86226]					[86295]

Notes: The sample contains all employees (excluding the self-employed and full time students)
Using the QLFS 2001 to 2004.
a estimated with no controls using a Multinomial logit and a pooled sample of men and women.

Table 3. Estimates of over-education by method including productivity related controls, by gender and ethnicity.

	Men			Women		
	Actual Qualification Dummies		Highest NVQ dummies	Actual Qualification Dummies		Highest NVQ dummies
Ethnic origin	Without Controls	With Controls	With Controls	Without Controls	With Controls	With Controls
White	29.7	30.5	35.9	42.9	38.2	44.3
			[80756]			[81270]
Black Caribbean	31.1	34.6	38.9	40.2	39.6	47.9
			[636]			[844]
Black African	58.0	41.5	48.3	51.3	46.8	61.1
			[555]			[581]
Black - other	33.8	29.7	36.5	37.9	35.6	40.9
			[222]			[303]
Indian	35.1	29.9	35.2	42.5	39.1	43.9
			[1496]			[1347]
Pakistani	40.6	32.1	31.9	47.1	35.3	41.4
			[704]			[382]
Bangladeshi	41.6	29.4	25.3	45.4	31.9	39.2
			[269]			[97]
Chinese	45.1	29.7	35.9	54.9	43.2	49.8
			[273]			[271]
Other	44.9	35.8	39.2	49.2	37.1	46.2
			[1315]			[1200]
Total	30.4	30.7	35.9	43.1	38.2	44.5
			[86226]			[86295]

Notes: The sample contains all employees (excluding the self-employed and full time students) Using the QLFS 2001 to 2004.
Estimated using a Multinomial logit and a pooled sample of men and women.

Figure 1. Women's range of percentages of over education

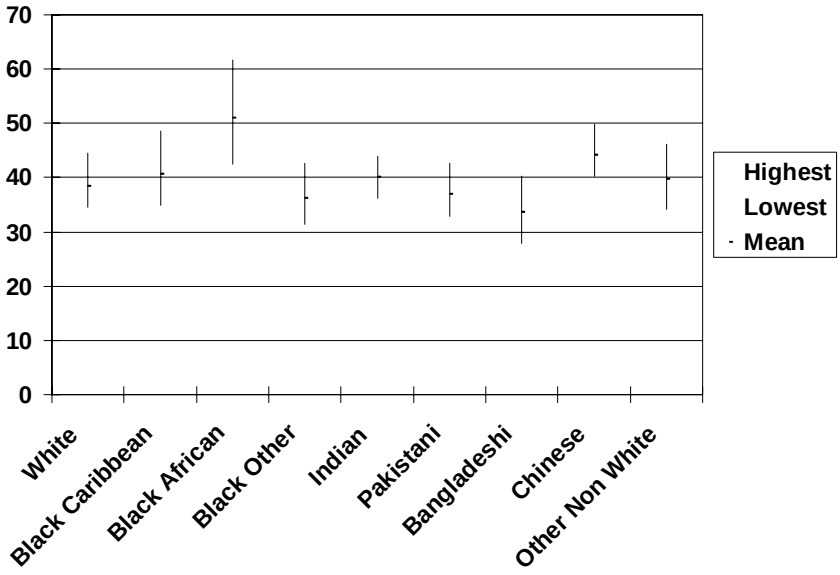

Figure 2. Men's range of percentages of over education

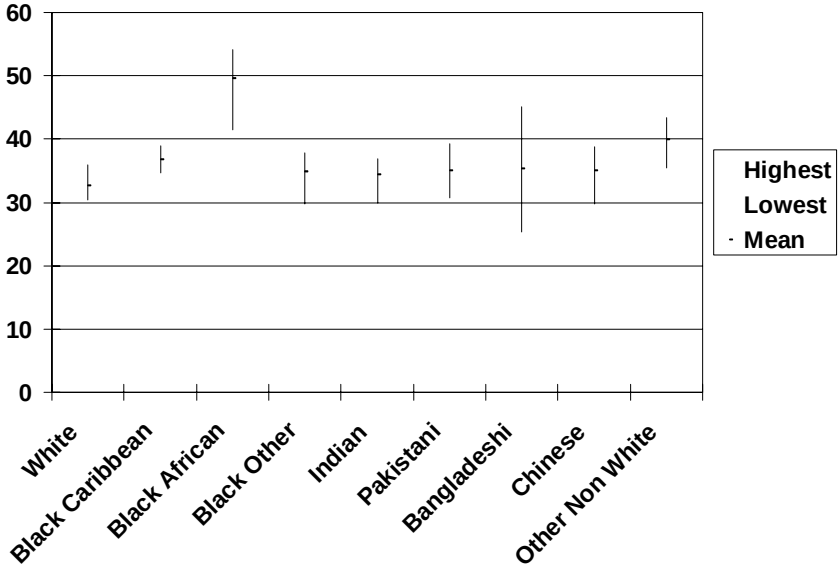

Table 4. Estimates of over-education including productivity related controls and other explanations of over-education, by gender and ethnicity.

	Single Equation (pooled men and women) [a]		Separate Gender Equations [b]	
Women	Including productivity controls	Including extra controls [c]	Including productivity controls	Including extra controls [c]
White	38.2	37.2	34.5	33.4
Black Caribbean	39.6	38.4	34.9	33.5
Black African	46.8	47.5	44.2	44.2
Black Other	35.6	32.7	32.7	29.7
Indian	39.1	38.8	37.7	37.9
Pakistani	35.3	34.8	32.9	31.2
Bangladeshi	31.9	38.1	31.9	35.1
Chinese	43.2	43.5	42.1	40.9
Other Non White	37.1	37.3	34.1	33.5
Total	***38.2***	***37.2***	***34.6***	***33.5***
Men				
White	30.5	29.4	31.7	30.7
Black Caribbean	34.6	35.8	36.0	37.6
Black African	41.5	42.9	49.7	49.7
Black Other	29.7	31.5	35.1	37.8
Indian	29.9	31.1	32.8	34.4
Pakistani	32.1	33.4	39.2	39.8
Bangladeshi	29.4	30.4	42.4	39.4
Chinese	29.7	30.0	34.4	34.1
Other Non White	35.8	36.1	40.8	40.9
Total	***30.7***	***29.7***	***32.2***	***31.2***

Notes: The sample contains all employees (excluding the self-employed and full time students)
Using the QLFS 2001 to 2004. Estimated using a Multinomial logit and actual education dummies.
a Based on a single equation (pooled sample of men and women) and including productivity related controls.
b Based on separate equations for men and women and including productivity related controls.
c These extra controls are 19 degree subject dummies, an upward mobility dummy and whether recently arrived in the UK (after 2002).

Appendix: Supplementary Tables

Table A1. Per cent over education mismatch found in earlier studies

	Lindley and Lenton 2006				**Battu & Sloane* 2004**
	Native men	Immigrant men	Native women	Immigrant women	Men& women
White	37	56	38	61	29 (1154)
Caribbean	41	63	47	53	30 (531)
African	79	84	61	77	
Indian	66	74	63	70	39 (485)
Pakistani/ Bangladeshi	61	63	52	58	35 (227) 33 (93)
Other	54	74	56	72	
African Asian					38 (335)
Chinese					31 (93)
Total	37	63	38	63	

* sample sizes in parentheses

Appendix Table A2. One digit occupation codes ranked by average real gross hourly pay.

SOC 2000 occupations (N)	Hourly wage £ per hour. [a]	% of men's workforce	% of women's workforce	% total workforce
Professionals (2)	16.37 [12.1]	12.6	10.5	11.6
Managers (1)	16.22 [13.6]	18.0	9.0	13.5
Associate professionals (3)	12.22 [13.9]	13.1	13.5	13.3
Administrative-clerical (4)	8.50 [14.6]	5.4	23.6	14.5
Skilled trade and Process & plant (5+8)	8.23 [16.7]	30.7	4.8	17.7
Personal and protective services (6)	6.62 [8.0]	2.3	13.6	7.9
Sales (7)	6.09 [8.5]	4.7	12.6	8.6
Other Elementary (9) (Reference Grp)	5.96 [12.7]	13.2	12.4	12.8
Total %	10.28 [100]	100	100	100
Sample size	126641	86226	86295	172521

Sample: All employees (excluding the self-employed and full time students) using the LFS 2001 to 2004
a taken from a sub sample with reported earnings information, where column percentages are in square brackets.

Appendix Table A3. Distribution of ethnic groups by occupations, for women and men.

Percentages

SOC 2000 occupations (N)	White		Black Caribbean		Black African		Black Other		Indian		Pakistani		Bangla deshi		Chinese		Other Non-White	
	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M
Professionals (2)	10.4	12.4	9.6	10.1	8.6	16.9	9.2	9.9	14.6	21.6	12.8	12.4	11.3	7.8	14.4	23.1	12.8	17.9
Managers (1)	9.2	18.4	7.4	11.0	5.7	9.6	8.3	11.7	6.2	15.5	4.9	9.2	5.2	9.7	8.5	13.9	6.83	14.8
Associate professionals (3)	13.3	13.2	18.1	12.6	21.3	11.2	21.1	10.8	13.4	9.4	10.5	8.9	7.2	5.9	15.1	10.3	22.8	14.6
Administrative-clerical (4)	23.8	5.3	24.9	5.9	16.4	6.9	18.2	4.1	23.5	9.4	20.4	6.8	23.7	5.2	17.7	5.1	18.0	5.4
Skilled trade and Plant (5 & 8)	4.7	31.1	2.9	33.9	4.7	11.9	6.9	27.9	8.6	22.9	7.1	29.6	6.2	33.5	4.1	21.6	4.2	18.0
Personal and protective services (6)	13.6	2.3	16.4	4.6	21.0	7.2	11.9	4.5	7.4	1.5	14.4	0.8	16.5	0.4	7.4	1.1	12.9	3.5
Sales (7)	12.6	4.4	10.1	4.7	8.8	8.1	14.9	8.1	14.4	8.2	18.1	12.2	21.6	13.0	14.4	11.4	11.3	8.3
Other Elementary (9)	12.5	12.9	10.7	17.1	13.6	28.3	9.6	22.9	11.9	11.7	11.8	20.0	8.3	24.5	18.5	13.6	11.2	17.5
Total %	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
N	81270	80756	844	636	581	555	303	222	1347	1496	382	704	97	269	271	273	1200	1315

Sample: All employees (excluding the self-employed and full time students) using the LFS 2001 to 2004.
W- women. M- men

Table A4. Coefficients from multinomial logit model containing only years of schooling.

Highest qualification	Professionals		Managers		Ass Prof		Admin/Clerical		Trade/Plant		Pers/Protect		Sales	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Schooling	0.649	0.006	0.395	0.005	0.406	0.005	0.241	0.006	-0.076	0.006	0.132	0.007	0.178	0.007
Constant	-9.14	0.085	-5.29	0.075	-5.29	0.075	-2.95	0.074	1.248	0.079	-2.142	0.092	-2.642	0.086
Log Pseudo Likelihood	-331734.69													
N	172521													

Sample: Pooled LFS 2001 to 2004. All employees,(excluding self employed and FT students).
Robust standard errors in parentheses. Insignificant coefficients at 95% confidence indicated in bold.

Table A5. Coefficients from multinomial logit model containing only Highest Qualification dummies.

Highest qualification	Professionals		Managers		Ass Prof		Admin/Clerical		Trade/Plant		Pers/Protect		Sales	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Higher degree	8.397	0.160	5.009	0.145	5.205	0.147	2.944	0.153	0.491	0.184	1.921	0.174	1.188	0.188
NVQ level 5	4.566	0.370	3.665	0.321	3.528	0.338	2.333	0.344	1.412	0.342	1.683	0.388	0.930	0.427
First degree	6.690	0.092	4.022	0.060	4.597	0.064	2.738	0.061	0.178	0.074	1.605	0.071	1.412	0.069
Other degree	7.747	0.250	5.220	0.240	5.212	0.244	3.377	0.249	0.945	0.284	1.792	0.297	1.441	0.299
NVQ level 4	5.198	0.273	4.128	0.246	4.522	0.249	3.359	0.249	1.638	0.261	2.592	0.266	1.407	0.301
Diploma in higher education	5.328	0.141	2.938	0.125	4.050	0.121	2.195	0.128	**0.123**	**0.155**	1.874	0.137	0.857	0.158
HNC,HND,Btec etc higher	5.309	0.104	3.576	0.075	4.008	0.078	2.378	0.077	1.459	0.075	1.575	0.089	1.348	0.087
Teaching, further education	6.335	0.309	2.816	0.328	4.379	0.305	2.485	0.324	**0.370**	**0.388**	2.059	0.348	1.153	0.388
Teaching, secondary education	8.442	0.585	3.355	0.624	4.352	0.609	3.199	0.613	1.245	0.667	3.368	0.611	1.623	0.707
Teaching, primary education	8.132	0.388	2.508	0.446	3.169	0.441	3.106	0.404	**-0.701**	**0.690**	3.697	0.395	**0.930**	**0.535**
Teaching, level not stated	6.689	0.597	2.074	0.731	4.454	0.606	2.586	0.641	**0.994**	**0.690**	2.634	0.646	**0.525**	**0.913**
Nursing etc	4.232	0.182	3.043	0.147	5.907	0.136	2.086	0.155	-0.530	0.225	3.566	0.139	1.247	0.173
RSA higher diploma	3.339	0.650	2.662	0.472	3.100	0.480	3.240	0.433	-0.259	0.646	**0.555**	**0.708**	1.536	0.508
Other higher education below degree	4.692	0.173	2.746	0.154	3.359	0.154	2.292	0.153	0.421	0.177	2.017	0.162	1.046	0.183
NVQ level 3	3.160	0.131	2.138	0.084	2.989	0.084	2.261	0.077	1.528	0.073	2.632	0.075	1.171	0.088
GNVQ advanced	2.055	0.235	0.885	0.154	2.039	0.131	1.556	0.115	-0.364	0.144	0.996	0.135	1.325	0.116
A level or equivalent	3.322	0.089	2.245	0.046	2.736	0.051	2.017	0.043	-0.300	0.051	0.753	0.055	1.172	0.046
RSA advanced diploma	2.541	0.663	2.257	0.388	2.761	0.392	3.646	0.329	**-0.547**	**0.548**	1.343	0.438	**0.574**	**0.493**
OND, ONC, Btec etc, national	3.796	0.123	2.647	0.085	3.208	0.088	2.227	0.083	1.189	0.082	1.559	0.094	1.013	0.098
City & guilds advanced craft	3.384	0.121	2.468	0.077	2.570	0.085	0.795	0.096	2.378	0.066	0.933	0.096	0.273	0.106
Scottish csys	2.205	0.456	1.176	0.299	1.426	0.329	1.155	0.266	-1.106	0.401	**0.314**	**0.357**	1.032	0.262

SCE higher or equivalent	2.554	0.157	1.640	0.096	2.285	0.097	1.906	0.083	**-0.203**	**0.105**	0.675	0.113	1.147	0.092
A,S level or equivalent	0.833	0.295	-1.080	0.253	0.427	0.168	**0.154**	**0.125**	-1.616	0.170	**-0.070**	**0.143**	1.151	0.089
Trade apprenticeship	2.551	0.097	1.752	0.048	1.953	0.055	0.170	0.059	1.715	0.036	0.734	0.053	**-0.014**	**0.059**
NVQ level 2	1.219	0.165	0.559	0.082	1.372	0.079	1.339	0.058	0.559	0.054	1.891	0.055	0.854	0.062
GNVQ intermediate	**-0.174**	**0.588**	**-0.020**	**0.199**	0.993	0.168	0.688	0.132	-0.276	0.130	0.662	0.138	1.066	0.113
RSA diploma	2.010	0.631	1.866	0.321	1.588	0.400	3.317	0.257	**-0.048**	**0.361**	1.248	0.344	0.987	0.339
City & guilds craft	2.130	0.195	1.542	0.108	1.681	0.122	0.630	0.121	1.097	0.088	0.732	0.122	0.330	0.125
Btec,scotvec first or general diploma e	1.907	0.414	1.146	0.241	2.048	0.220	1.653	0.191	0.051	0.219	**1.153**	**0.220**	0.953	0.213
O level, GCSE a-c or equivalent	1.914	0.086	1.437	0.035	1.858	0.042	1.747	0.030	**0.066**	**0.027**	**0.735**	**0.035**	0.896	0.030
NVQ level 1	**-0.079**	**0.458**	-0.503	0.199	-0.542	0.261	**-0.051**	**0.138**	0.069	0.097	**0.439**	**0.122**	**0.007**	**0.126**
GNVQ GSVQ foundation level	**1.303**	**0.741**	**-0.474**	**0.614**	**0.370**	**0.543**	**-0.070**	**0.432**	0.007	0.306	0.058	0.432	**-0.008**	**0.394**
CSE below grade1,GCSE below grade c	0.488	0.154	**0.470**	**0.058**	0.824	0.066	0.736	0.047	**0.247**	**0.039**	**0.350**	**0.054**	0.347	0.048
Btec,scotvec first or general certifica	2.492	0.805	**1.004**	**0.627**	**1.272**	**0.691**	1.477	0.493	0.146	0.535	**1.382**	**0.518**	**0.083**	**0.690**
Scotvec modules	-25.863	0.207	**-0.634**	**0.609**	**0.209**	**0.537**	**0.532**	**0.323**	0.109	0.275	**0.948**	**0.296**	**0.199**	**0.338**
RSA other	1.554	0.267	0.982	0.138	1.315	0.150	2.670	0.092	**-0.643**	**0.146**	**1.020**	**0.124**	0.975	0.115
City & guilds other	1.666	0.344	0.583	0.216	0.627	0.263	**0.234**	**0.208**	**0.577**	**0.145**	**0.778**	**0.182**	**0.104**	**0.204**
YT, YTP certificate	-26.049	0.226	**-0.141**	**0.544**	**-0.972**	**1.023**	**-0.362**	**0.496**	**0.489**	**0.279**	-0.457	0.544	**0.612**	**0.329**
Other qualification	1.466	0.103	0.731	0.048	0.974	0.056	0.373	0.044	**0.600**	**0.032**	**0.585**	**0.044**	-0.229	0.049
Foreign Higher Qualification	4.157	0.109	1.765	0.087	2.261	0.090	0.993	0.092	**-0.201**	**0.096**	**0.623**	**0.106**	0.263	0.107
Constant	-3.745	0.076	-1.563	0.028	-2.119	0.035	-1.120	0.023	**-0.146**	**0.017**	**-1.248**	**0.024**	-0.930	0.022
Log Pseudo Likelihood	-301991.69													
N	172521													

Sample: Pooled LFS 2001 to 2004. All employees,(excluding self employed and FT students). No qualifications is the base category.
Robust standard errors in parentheses. Insignificant coefficients at 95% confidence indicated in bold.

Table A6. Coefficients from multinomial logit model containing only Actual qualification dummies

	Professionals		Managers		Ass Prof		Admin/Clerical		Trade/Plant		Pers/Protect		Sales	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff		Coeff		SE		Coeff	SE
PHD	5.990	0.712	4.318	0.713	3.581	0.718	2.282	0.746	**1.180**	**0.791**	1.757	0.817	**0.997**	**0.913**
Masters	3.461	0.183	2.944	0.181	2.675	0.183	1.668	0.190	**0.192**	**0.224**	0.860	0.231	0.610	0.240
PGCE	4.854	0.322	1.790	0.338	2.361	0.331	1.669	0.345	**-0.306**	**0.459**	1.978	0.355	0.900	0.414
Oth High	4.651	0.590	3.872	0.587	3.732	0.589	2.820	0.596	**0.304**	**0.730**	2.062	0.641	1.825	0.652
Degree	3.107	0.067	2.114	0.066	1.951	0.066	1.029	0.068	0.235	0.082	0.801	0.079	0.403	0.078
DipEd	1.572	0.140	0.983	0.137	1.275	0.135	0.451	0.143	-0.426	0.177	0.749	0.153	**0.085**	**0.170**
HND	1.866	0.085	1.603	0.081	1.501	0.082	0.673	0.085	0.728	0.085	0.492	0.099	0.409	0.097
OND	1.552	0.133	1.329	0.128	1.399	0.129	0.612	0.134	1.138	0.129	0.394	0.157	**-0.004**	**0.169**
Btec	0.937	0.086	0.809	0.077	1.074	0.073	0.631	0.074	0.331	0.077	0.737	0.082	0.364	0.082
Scotvec	-0.842	0.147	-0.739	0.126	-0.222	0.112	**0.148**	**0.102**	**0.093**	**0.104**	0.202	0.121	**-0.035**	**0.116**
Teaching	4.019	0.242	1.061	0.253	1.680	0.247	1.089	0.254	**0.152**	**0.295**	2.119	0.253	0.537	0.298
Nursing	1.403	0.165	1.524	0.157	3.828	0.147	0.561	0.169	-1.116	0.267	2.718	0.153	0.388	0.195
Othhed	1.435	0.165	0.993	0.159	1.065	0.158	0.453	0.165	**-0.090**	**0.189**	1.055	0.169	**0.273**	**0.187**
Alevel	1.059	0.045	0.722	0.042	0.795	0.042	0.541	0.042	-0.444	0.050	0.099	0.051	0.333	0.047
SCEhigher	1.057	0.107	0.621	0.100	0.691	0.098	0.599	0.096	-0.540	0.109	**0.102**	**0.119**	0.418	0.106
NVQ	-0.297	0.061	**0.080**	**0.045**	0.223	0.043	0.252	0.040	0.413	0.039	1.175	0.040	0.144	0.045
GNVQ	-0.455	0.137	-0.387	0.109	**0.018**	**0.089**	**0.099**	**0.081**	-0.299	0.087	0.213	0.090	0.328	0.077
As	-0.646	0.124	-1.187	0.130	-0.868	0.111	-0.782	0.108	-1.468	0.154	-0.759	0.140	0.247	0.088
Csys	**-0.139**	**0.234**	**-0.260**	**0.235**	**-0.104**	**0.223**	-0.516	0.240	-0.848	0.330	-0.538	0.323	**0.135**	**0.245**
Olevel	0.757	0.037	1.329	0.032	1.136	0.033	1.248	0.032	0.246	0.033	0.626	0.037	0.577	0.038
Sce	-0.671	0.090	**-0.082**	**0.076**	**0.096**	**0.074**	0.410	0.071	**-0.075**	**0.068**	**-0.045**	**0.085**	0.490	0.077
GCSE	-0.910	0.038	-0.634	0.033	-0.138	0.030	0.081	0.028	-0.346	0.028	-0.197	0.034	0.516	0.030
CSE	-0.495	0.046	-0.207	0.037	-0.120	0.037	**-0.016**	**0.035**	-0.064	0.034	**0.055**	**0.040**	0.127	0.040
RSA	**-0.093**	**0.069**	**0.057**	**0.057**	0.361	0.055	1.852	0.047	-0.977	0.069	0.482	0.058	0.654	0.056
C and G	0.392	0.048	0.588	0.039	0.459	0.040	-0.402	0.044	1.409	0.034	0.167	0.045	-0.296	0.050
YTC	**-0.413**	**0.234**	-0.334	0.169	**-0.282**	**0.160**	**-0.226**	**0.143**	**0.055**	**0.129**	**-0.036**	**0.159**	**-0.077**	**0.159**
Qual other	-0.496	0.121	-0.259	0.094	**-0.110**	**0.091**	**-0.122**	**0.089**	-0.209	0.080	**0.059**	**0.093**	-0.405	0.110
Foreign	1.407	0.076	0.606	0.078	0.708	0.079	0.152	0.084	-0.554	0.087	**0.104**	**0.095**	**-0.043**	**0.098**
Constant	-1.179	0.016	-0.540	0.014	-0.706	0.014	-0.406	0.013	0.206	0.011	-0.767	0.015	-0.689	0.015
Log Pseudo Likelihood		-311652.48												
N		172521												

Sample: Pooled LFS 2001 to 2004. All employees,(excluding self employed and FT students). No qualifications is the base category. Insignificant coefficients at 95% confidence indicated in bold.

Table A7. Coefficients from multinomial logistic regression using all educational qualifications.

	Professionals		Managers		Ass Prof		Admin/Clerical		Trade/Plant		Pers/Protect		Sales	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Age	1.828	0.072	2.277	0.071	1.869	0.061	1.245	0.054	0.916	0.050	1.063	0.063	-0.469	0.056
Age Sq	-0.226	0.009	-0.271	0.009	-0.251	0.008	-0.155	0.007	-0.122	0.006	-0.119	0.008	0.042	0.007
Child	0.056	0.025	**0.001**	**0.023**	-0.107	0.022	-0.136	0.021	-0.098	0.020	0.186	0.024	0.071	0.023
OtJ training past 13 weeks	1.287	0.026	0.631	0.025	1.204	0.024	0.643	0.023	0.267	0.023	1.275	0.025	0.397	0.025
Tenure3-5mths	0.215	0.075	0.201	0.072	0.217	0.061	**0.004**	**0.052**	**0.076**	**0.048**	**0.080**	**0.060**	**0.056**	**0.050**
Tenure6-11mths	0.370	0.067	0.315	0.065	0.408	0.055	0.133	0.047	0.109	0.044	0.299	0.054	0.101	0.046
Tenure12-23mths	0.638	0.063	0.429	0.062	0.635	0.052	0.262	0.045	0.241	0.042	0.415	0.052	0.225	0.044
Tenure24-59mths	0.838	0.059	0.581	0.057	0.768	0.049	0.424	0.041	0.406	0.039	0.517	0.048	0.234	0.041
Tenure60-119mths	0.954	0.062	0.723	0.059	0.872	0.052	0.525	0.044	0.530	0.041	0.547	0.051	0.163	0.046
Tenure120-239mths	1.154	0.062	0.866	0.059	1.148	0.051	0.745	0.044	0.643	0.042	0.457	0.052	0.096	0.048
Tenure 240+mths	1.691	0.068	1.257	0.065	1.663	0.058	1.020	0.052	1.099	0.049	0.274	0.064	-0.233	0.066
Supervisor	1.435	0.028	3.282	0.028	1.211	0.026	0.426	0.026	0.534	0.025	0.198	0.031	0.391	0.030
Phd	5.822	0.721	3.978	0.723	3.454	0.729	2.215	0.751	**1.155**	**0.793**	1.668	0.822	**0.993**	**0.914**
Masters	3.186	0.191	2.618	0.190	2.402	0.190	1.507	0.194	**0.127**	**0.225**	0.666	0.234	0.514	0.241
PGCE	4.627	0.331	1.642	0.348	2.153	0.339	1.564	0.350	**-0.345**	**0.460**	1.770	0.360	0.874	0.415
Other Higher	4.271	0.602	3.391	0.601	3.377	0.601	2.661	0.605	**0.219**	**0.731**	1.849	0.648	1.716	0.655
Degree	3.033	0.069	2.013	0.069	1.855	0.068	0.959	0.069	0.184	0.083	0.724	0.080	0.464	0.079
DipEd	1.319	0.146	0.713	0.145	1.060	0.140	0.320	0.146	-0.497	0.180	0.582	0.155	**0.092**	**0.171**
HND	1.716	0.087	1.372	0.085	1.355	0.084	0.575	0.086	0.662	0.086	0.399	0.101	0.427	0.098
OND	1.453	0.135	1.226	0.132	1.317	0.130	0.536	0.134	1.099	0.129	0.313	0.159	**0.020**	**0.169**
Btec	0.765	0.088	0.623	0.081	0.855	0.076	0.526	0.075	0.233	0.077	0.648	0.083	0.336	0.082
Scotvec	-0.806	0.149	-0.603	0.136	-0.280	0.116	**0.138**	**0.103**	**0.071**	**0.106**	**0.181**	**0.124**	**-0.111**	**0.118**
Teaching	3.930	0.248	1.022	0.260	1.691	0.253	1.047	0.257	**0.126**	**0.298**	2.029	0.257	0.692	0.299
Nursing	0.835	0.167	0.775	0.159	3.350	0.149	0.354	0.170	-1.301	0.268	2.466	0.155	0.418	0.196
Oth higher ed	1.219	0.171	0.775	0.167	0.874	0.163	0.341	0.167	**-0.169**	**0.189**	0.923	0.173	**0.267**	**0.188**
A level	1.037	0.048	0.693	0.046	0.746	0.044	0.541	0.043	-0.451	0.050	**0.082**	**0.052**	0.307	0.047
SCE Higher	1.018	0.112	0.556	0.109	0.654	0.102	0.600	0.097	-0.547	0.109	**0.109**	**0.121**	0.380	0.107
NVQ	-0.487	0.063	-0.138	0.049	**0.030**	**0.045**	0.182	0.041	0.349	0.039	1.067	0.041	0.095	0.045
GNVQ	-0.229	0.141	**-0.034**	**0.119**	**0.146**	**0.093**	0.230	0.082	-0.204	0.087	0.290	0.092	0.227	0.078
AS	-0.307	0.137	-0.719	0.150	-0.554	0.121	-0.469	0.111	-1.224	0.153	-0.502	0.143	0.175	0.088
CSYS	**0.010**	**0.252**	**0.019**	**0.262**	**-0.016**	**0.236**	**-0.423**	**0.245**	-0.744	0.333	**-0.515**	**0.334**	**0.016**	**0.249**

O level	0.523	0.039	1.052	0.035	0.931	0.034	1.124	0.032	0.135	0.033	0.508	0.037	0.623	0.039
SCE	-0.666	0.094	**-0.038**	**0.085**	**0.033**	**0.078**	0.469	0.072	**-0.046**	**0.069**	**0.024**	**0.087**	0.326	0.079
GCSE	-0.478	0.044	**0.054**	**0.040**	0.077	0.035	0.356	0.033	-0.147	0.031	**0.035**	**0.039**	0.215	0.034
CSE	-0.778	0.048	-0.469	0.041	-0.441	0.039	-0.184	0.037	-0.205	0.035	-0.139	0.041	0.106	0.042
RSA	**-0.072**	**0.070**	0.187	0.061	0.412	0.056	1.817	0.047	-0.976	0.070	0.424	0.059	0.767	0.057
C and G	0.170	0.049	0.296	0.042	0.268	0.042	-0.537	0.044	1.310	0.034	**0.043**	**0.046**	-0.246	0.050
YTC	-0.494	0.239	-0.483	0.180	-0.447	0.166	-0.299	0.147	**-0.034**	**0.131**	**-0.074**	**0.163**	**-0.096**	**0.161**
Qual other	-0.487	0.128	-0.225	0.104	**-0.116**	**0.095**	**-0.103**	**0.090**	-0.180	0.081	**0.028**	**0.095**	-0.413	0.110
Foreign	1.557	0.080	0.826	0.087	0.743	0.082	0.226	0.085	-0.490	0.087	**0.105**	**0.098**	**-0.096**	**0.099**
_cons	-6.172	0.143	-7.291	0.145	-5.153	0.118	-3.240	0.105	-1.820	0.093	-3.767	0.123	**0.142**	**0.103**
Log Pseudo Likelihood	-288876.02													
N	172521													

Sample: Pooled LFS 2001 to 2004 All employees,(excluding self employed and FT students).
OtJ= on-the-job. Insignificant coefficients at 95% confidence indicated in **bold**.

Table A8. Coefficients from multinomial logistic regression using highest NVQ educational qualifications dummies and additional productivity measures.

	Professionals		Managers		Ass Prof		Admin/Clerical		Trade/Plant		Pers/Protect		Sales	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
NVQ 5	1.111	0.097	0.462	0.044	0.766	0.049	0.757	0.034	0.432	0.028	0.424	0.037	**0.016**	**0.036**
NVQ 4	1.966	0.086	1.355	0.039	1.754	0.043	1.838	0.030	0.298	0.027	0.945	0.034	0.681	0.030
NVQ 3	3.007	0.083	1.817	0.039	2.330	0.043	1.666	0.032	1.302	0.027	1.040	0.036	0.653	0.033
NVQ 2	6.163	0.085	3.387	0.049	4.300	0.051	2.627	0.045	0.761	0.046	1.904	0.049	1.130	0.049
NVQ 1	8.035	0.150	4.402	0.135	4.731	0.136	2.852	0.140	0.714	0.160	1.669	0.160	0.982	0.172
Foreign other qual	4.227	0.109	1.748	0.091	2.175	0.089	1.064	0.088	**-0.057**	**0.088**	0.578	0.100	**0.070**	**0.100**
age	2.081	0.073	2.632	0.067	2.109	0.059	1.567	0.049	1.279	0.047	1.156	0.057	-0.327	0.051
age squared	-0.233	0.009	-0.301	0.008	-0.262	0.008	-0.181	0.006	-0.156	0.006	-0.122	0.007	0.028	0.007
Child	-0.149	0.025	-0.115	0.023	-0.205	0.023	-0.268	0.021	-0.094	0.020	0.132	0.024	**0.009**	**0.023**
OtJ training past 13 weeks	1.053	0.027	0.455	0.025	1.085	0.024	0.567	0.023	0.201	0.023	1.242	0.026	0.358	0.026
Tenure3-5mths	0.179	0.073	0.175	0.073	0.213	0.062	**-0.019**	**0.052**	**0.084**	**0.049**	**0.088**	**0.060**	**0.043**	**0.050**
Tenure6-11mths	0.363	0.066	0.305	0.066	0.415	0.056	0.115	0.047	0.111	0.045	0.307	0.054	**0.087**	**0.046**
Tenure12-23mths	0.583	0.062	0.407	0.062	0.626	0.053	0.235	0.045	0.219	0.043	0.428	0.052	0.214	0.044
Tenure24-59mths	0.799	0.057	0.573	0.057	0.767	0.050	0.401	0.041	0.408	0.039	0.556	0.048	0.219	0.041
Tenure60-119mths	0.941	0.060	0.723	0.060	0.894	0.053	0.515	0.044	0.542	0.042	0.601	0.051	0.153	0.046
Tenure120-239mths	1.247	0.060	0.931	0.060	1.275	0.053	0.790	0.044	0.672	0.042	0.529	0.052	0.115	0.048
Tenure 240+mths	1.796	0.067	1.323	0.066	1.785	0.060	1.003	0.052	1.125	0.049	0.338	0.064	-0.226	0.066
Supervisor	1.101	0.029	3.107	0.029	1.064	0.026	0.270	0.026	0.490	0.025	0.155	0.031	0.324	0.030
Constant	-9.388	0.160	-8.937	0.137	-7.205	0.118	-4.746	0.096	-3.062	0.089	-4.514	0.111	-0.300	0.093
Log Pseudo Likelihood	-292779.23													
N	172521													

Sample: Pooled LFS 2001 to 2004. All employees,(excluding self employed and FT students).
OtJ= on-the-job. Insignificant coefficients at 95% confidence indicated in bold.

Table A9. Varying coefficients by gender for the child dummy variable only, estimated in separate gender models

	Professional	Manager	Associate professional	Administrative-clerical	Skilled trade/processs & plant	Personal & protective	Sales
Men and women [a]							
Child dummy	0.056 (0.025)	**0.001 (0.023)**	-0.107 (0.022)	-0.136 (0.021)	-0.098 (0.020)	0.186 (0.024)	0.071 (0.023)
Sample size	172521						
Women [b]							
Child dummy	-0.123 (0.038)	-0.474 (0.037)	-0.344 (0.033)	-0.029 (0.028)	-0.056 (0.042)	**0.030 (0.029)**	-0.075 (0.029)
Sample size	86295						
Men [b]							
Child dummy	0.021 (0.034)	0.261 (0.031)	0.096 (0.031)	-0.189 (0.039)	0.128 (0.025)	**-0.042 (0.055)**	**0.049 (0.039)**
Sample size	86226						

Sample: Pooled LFS 2001 to 2004. All employees,(excluding self employed and FT students). Robust standard errors in parentheses.
Insignificant coefficients at 95% confidence indicated in **bold**. Using actual educational qualification dummies and productivity controls.
a Based on a single equation (pooled sample of men and women) as per Table A7.
b Based on separate equations for men and women using same covariates as Table A7.

Table A10. Percent with over education among women and men by ethnicity and MNL model specification, comparing single and separate gender equations.

	Single Equation (pooled men and women)[a]			Separate Gender Equations [b]		
	Actual qualifications		Highest NVQ	Actual qualifications		Highest NVQ
Ethnic origin	Including child dummy.	Excluding child dummy.	Including child dummy.	Including child dummy.	Excluding child dummy.	Including child dummy.
Women						
White	38.2	38.5	44.3	34.5	35.0	37.1
Black Caribbean	39.6	40.9	47.9	34.9	35.8	38.9
Black African	46.8	47.3	61.1	44.2	42.5	51.6
Black Other	35.6	35.9	40.9	32.7	31.4	37.3
Indian	39.1	39.6	43.9	37.5	39.1	36.8
Pakistani	35.3	36.1	41.4	32.9	34.0	36.4
Bangladeshi	31.9	34.0	39.2	31.9	28.9	30.9
Chinese	43.2	42.8	49.8	42.1	40.2	42.4
Other Non White	37.1	37.8	46.2	34.1	35.0	37.0
Total	***38.2***	***38.6***	***44.5***	***34.6***	***35.1***	***37.2***
Men						
White	30.5	30.4	35.9	31.8	31.8	34.4
Black Caribbean	34.6	35.1	38.9	36.0	36.5	38.7
Black African	41.5	41.8	48.3	49.7	49.9	53.6
Black Other	29.7	30.2	36.5	35.1	33.3	36.9
Indian	29.9	30.1	35.2	32.8	32.8	36.9
Pakistani	32.1	31.5	31.9	39.2	38.4	38.8
Bangladeshi	29.4	29.7	25.3	42.4	42.4	39.4
Chinese	29.7	30.0	35.9	34.4	34.8	37.7
Other Non White	35.8	35.4	39.2	40.8	41.1	43.3
Total	***30.7***	***30.6***	***35.9***	***32.2***	***32.2***	***34.8***

Sample: All employees (excluding the self-employed and full time students) using the LFS 2001 to 2004

a Based on a single equation (pooled sample of men and women) and including productivity related controls.

b Based on separate equations for men and women and including productivity related controls.

Table A11. Per cent of employed women over educated by ethnic origin and hours of work.

	Full time Over educated%	**Part time Over educated%**	**% part time of employed**	**N**
White	33.9	43.8	43.2	81270
Black Caribbean	39.5	39.7	29.3	844
Black African	45.1	50.9	29.8	581
Black Other	33.7	39.8	32.3	303
Indian	37.0	43.3	33.7	1347
Pakistani	33.0	38.5	42.2	382
Bangladeshi	28.4	40.0	30.9	97
Chinese	36.7	52.7	40.6	271
Other non-White	36.3	38.7	33.8	1200
Total %	34.1	43.7	42.7	86295

Sample: Pooled LFS 2001 to 2004. All women employees, excluding self employed and full time students.
Based on a single equation (pooled men and women), including child dummy and using all educational qualifications.

Table A12. Comparison of recently arrived, career mobility and selected subject of degree by ethnicity.

	Recently Arrived %	Upward Mobility %	**A selection of Degree subjects [a]**					
			Medicine %	Medical Related %	Business %	Engineering %	Arts %	Education %
White	0.2	5.0	2.1	16.2	10.2	7.0	4.6	8.3
Black Caribbean	0.5	3.8	0.8	25.1	19.1	4.9	3.0	5.9
Black African	3.4	2.6	5.7	26.3	9.5	4.6	1.4	1.4
Black Other	0.6	4.6	2.0	16.3	23.5	4.1	9.2	4.1
Indian	1.7	3.3	10.2	11.9	11.1	8.7	2.0	2.1
Pakistani	1.6	2.8	6.4	15.4	11.9	7.7	1.3	3.4
Bangladeshi	3.8	2.2	6.2	6.2	15.4	9.2	4.6	1.5
Chinese	2.4	2.1	5.3	14.1	15.5	5.8	1.5	4.4
Other non-White	3.6	2.9	5.7	22.9	11.2	8.5	3.9	3.5
Total %	0.3	4.9	2.4	16.4	11.9	7.0	4.5	7.8

Sample: All employees (excluding the self-employed and full time students) using the LFS 2001 to 2004
a Percentage from the sample of graduates only.